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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,137	09/04/2001	Nobuyuki Matsumoto	35.C15739	1747

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 03/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/944,137

Applicant(s)

MATSUMOTO ET AL.

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5 and 10-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,10 and 12 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3-5, 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imanaka et al. (EP 0920999) in view of Miyakawa (US 4550327) and Ohshima et al. (EP 0569201 A1).

Imanaka discloses a liquid discharge apparatus comprising:

a liquid discharge head comprising a discharge port for discharging liquid (FIG. 1, element 5);

a liquid flow path (FIG. 1, element 7) communicating with said discharge port having a bubble generating region for generating a bubble (FIG.1: the region is above element 2);

a discharge energy generating element (FIG. 1, element 2) for generating thermal energy for generating the bubble in the liquid inside said bubble generating region; and

a movable member (FIG. 1, element 6) facing said discharge energy generating element spaced apart from said discharge energy generating element, an end portion of said movable member situated at an upstream side in the flow direction of the liquid inside said liquid flow path being fixed and a down stream end thereof being a free end;

a temperature sensor for detecting a temperature inside the printhead (column 3,

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line 13-16 and column 4, line 12-19: a temperature sensor is provided in the second substrate that constitutes a plurality of liquid flow paths); and

means for controlling or stopping the driving to said discharge energy generating element by estimating that the liquid is no longer being supplied into the printhead based on data on temperature, detected by said temperature sensor (column 4, line 12-25: A limitation circuit limits or stops driving the heat generating circuit in accordance with output of the temperature sensor).

Imanaka et al. (EP 0920999) do not disclose wherein the temperature is detected at a predetermined period inside said liquid flow path and based on data on temperature rise per period detected by the temperature sensor, means for controlling or stopping the driving to said discharge energy generating element estimates that the liquid is no longer being supplied into the liquid flow path.

Miyakawa discloses a printhead comprising a plurality of liquid flow paths (claim 1) connected to liquid discharged port (FIG. 1), wherein each flow path has a temperature detector (FIG. 1, element 12) for periodically detecting, at a predetermined period, a temperature inside the liquid flow path (claim 4). If the temperature rise per period is above a reference level due to the absence or unfilled of ink in the liquid flow path, the discharge energy generating element is disabled (claims 5, 6 and column 3, line 3-7: the rate of change of temperature).

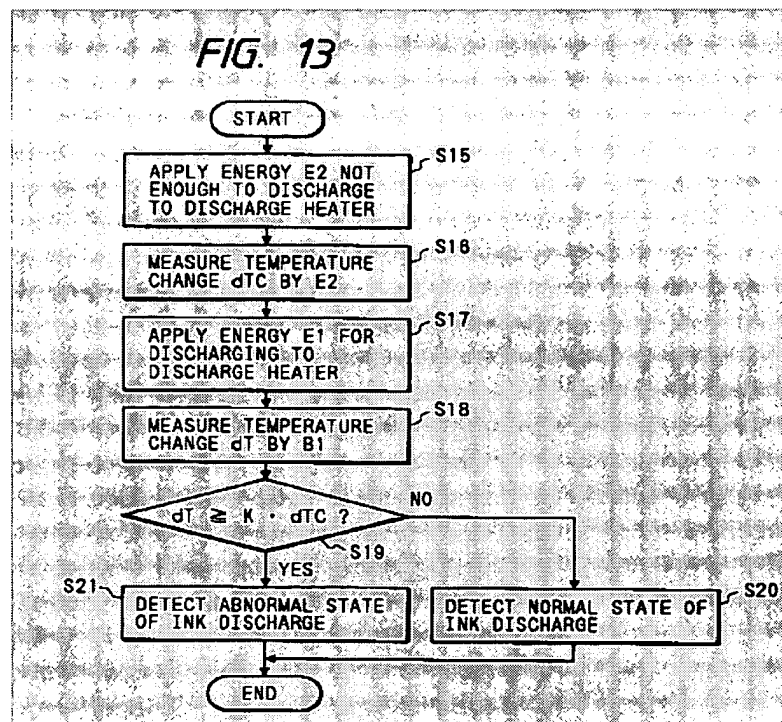
Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printhead disclosed by Imanaka such that including a temperature sensor in each liquid flow path to detect the temperature rise due to the absence of ink in the liquid flow path as disclosed by Miyakawa. The motivation of doing so is to permit

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exact detection of presence of ink or the presence of bubble in each ink discharging nozzle in order to provide an excellent device for discharging liquid droplets having high reliability as taught by Miyakawa (column 1, line 57-61 and column 4, line 1-5).

In addition, Imanaka et al. do not disclose wherein means for controlling or stopping the driving of said discharge energy generating elements by estimating that the liquid is no longer being supplied into the liquid flow path or the liquid supply to the liquid flow path has become abnormal, by comparing the data on temperature rise per unit hour detected by said temperature sensor and data on temperature rise determined in accordance with the printing data (**Referring to claims 1, 5, 10**) and the comprising of a first memory for storing the data on temperature rise per unit hour detected by said temperature sensor and a second memory for storing the data on temperature rise determined in accordance with the printing data (**Referring to claim 11**).

Oshima et al. disclose a method for detecting the abnormality of ink discharged (FIG. 13, steps S20-21) based on the data on temperature rise due to the state of ink (filled or unfilled of ink in an ink flow path) (FIG. 9: dTA and dTB) and printing data, representing by energy applied to discharge heater (FIG. 9: dTC and column 13, line 45-50), by comparing the data on temperature rise per period detected by said temperature sensor (FIG. 13, steps S18-19: dT) and the data on temperature rise determined in accordance with the printing data (FIG. 13, step S19: dTC), wherein the data on temperature rise by the temperature sensor and in accordance with the printing data are stored in corresponding memories (FIG. 5).



Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the process for controlling or stopping the driving of said discharge energy generating element based on the temperature rise per period detected by the temperature sensor as disclosed by Imanaka et al., such that the process is also based on printing data as disclosed by Oshima et al. The motivation of doing so is to provide an ink jet recording apparatus capable of high precise detecting the temperature characteristics as taught by Oshima et al. (column 3, line 6-13).

Imanaka et al. also disclose the limitation in the following claims:

Referring to claim 3: further comprising driving signal supply means (Fig. 4) for supplying a driving signal for allowing the liquid to eject from said liquid discharge head.

Referring to claim 4: further comprising a conveyance means for conveying the medium to be recorded which receives the liquid discharged from said liquid discharge head (FIG. 17, element 161).

Allowable Subject Matter

2. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The most pertinent art fails to disclose wherein the temperature rise data determined in accordance with the printing data corresponds to a ratio of number of said liquid flow paths through which liquid is discharged from said discharge port per unit hour obtained from the printing data with respect to a total number of said liquid flow path. Therefore, the claimed invention is not disclosed by the cited prior art.

Response to Arguments

Applicant's arguments with respect to claims 1,5 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
March 6, 2004


HAI PHAM
PRIMARY EXAMINER